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Operational and Mission Highlights

A MONTHLY SUMMARY OF TOP ACHIEVEMENTS

August 2021

Contents

NUCLEAR SECURITY

- Dynamic Experiments Yield Key Data for Shock and Defect Impacts on Component Performance 1
- NNSA Features Natalie Klein for Exemplary Work in Artificial Intelligence for National Security 1

SCIENCE, TECHNOLOGY, AND ENGINEERING

- ASC Breakthrough Advances Quantum Machine Learning 1
- David Chavez Selected Fellow of the American Chemical Society 1
- Decades of Research Bring Quantum Dots to Brink of Widespread Use 2
- Laboratory Personnel Earn Honors and Garner Recognition 2
- Travis Sjostrom Honored for Excellence in Plasma Physics Research 2
- Wenting Li Awarded “Best Paper” for Machine-Learning Innovation at ICML Workshop 3

MISSION OPERATIONS

- Acquisition Services Management Staff Members Complete More Than 450 Hours of Ariba Training 3
- ALDFO Crew Repairs Priority Waterline 3
- ALDFO Crews Upgrade Electrical Parts for Ion Beam Material Laboratory 3
- Deputy Secretary of Energy David Turk Gives Keynote Speech at Lab-Hosted CECOP Symposium 3
- High-Precision Camera System Deployed in July 2021 Yields Machining Efficiency 4
- Laboratory’s Funding Determination Committee Improves Services 4
- Laboratory’s Information & Technology Organization Launches New IT Ticketing System 4
- Laboratory Welcomes NGD Systems to the Efficient Mission Centric Computing Consortium 5
- Laboratory Will Require All Employees and Contractors to be Fully Vaccinated Against COVID-19 5
- Logistics and Maintenance Site Services Work Together to Repair Cooling Coils at Otowi 5
- Low-Oxygen Alarm Training Pays Off 6
- Maintenance and Equipment Updates Support Plutonium Operations 6
- Newly Installed Badge Readers Enhance Office Safety and Security 6
- New Storage Facility Checks All the Boxes 6
- New Tool Streamlines Los Alamos Awards Program Nomination Process, Tracking, and Approvals 7
- New Waterline and Fire-Suppression System Installed at Weapons Engineering Facility 7
- NIE, HR, and Badge Office Collaborate to Streamline Onboarding Process for New Hires 7

Unauthorized Drone Flights are Prohibited in Laboratory-Restricted Airspace 7

Upgrades to West Road Create a Safer Road 8

COMMUNITY RELATIONS

Bradbury Hosts First Periodic Table Event 8

Community Partnerships Office Shares with Employees a Report on Childcare Availability 8

Laboratory and Los Alamos Community Leaders Celebrate Opening of NET Facility on East Road 9

Laboratory-Organized Summer Camp Helps Middle-School Students Believe in Their Math Abilities 9

Laboratory's Staff Director Gives "State of the Lab" to New Mexico's Science, Technology and Telecommunications Interim Committee 9

New Laboratory Partnership Enables Northern New Mexico Math Teachers to Earn New Specialty Degree 10

New Program Offers High-School Students a Path to Trade Apprenticeships 10

Nonprofit Leaders Learn About New Laboratory Partnership Opportunities at Online Event 10

SELECTED MEDIA COVERAGE 11

Dynamic Experiments Yield Key Data for Shock and Defect Impacts on Component Performance

During the week of July 19, 2021, the Laboratory fielded two dynamic experiments at the Los Alamos Neutron Science Center's Proton Radiography (pRad). These experiments support the potential future Pu@pRad studies of the impact of defects on component performance. Scientists used these experiments to study explosively-driven shock wave propagation through metals with defects in different surface locations. The pRad data show the movement of the shock wave through the metal coupon, where scientists can observe changes in shock dynamics and material failure created by the defects.

NNSA Features Natalie Klein for Exemplary Work in Artificial Intelligence for National Security

Laboratory scientist Natalie Klein of Statistical Sciences (CCS-6) recently had her work featured in an NNSA article on a national collaboration to drive next-generation in artificial intelligence (AI) for nonproliferation. Titled "One-Shot Target Detection Via Physics-Informed Training," Klein's project investigates one of the common challenges faced in AI for a specific domain of knowledge: a lack of usable data.

Klein and her team worked to train a deep neural network to characterize materials reliably on the ground, even in the absence of such comprehensive training images from hyperspectral data. To overcome such lack of data, the team generated its own synthetic data using domain-specific knowledge of physics and chemistry. Informed by these generated data, the network could accurately detect materials, even when faced with new and authentic data that contained novel materials and unseen environmental conditions.

Klein anticipates the model could quickly detect materials in new data without needing to account for environmental conditions that may influence the signatures. Furthermore, this type of airborne detection could be used to recognize nuclear materials in support of non-proliferation efforts.

ASC Breakthrough Advances Quantum Machine Learning

Scientists at the Laboratory's Advanced Simulation and Computing (ASC) Division have established rigorous mathematical theorems that guarantee whether a given machine-learning algorithm will avoid barren plateaus and work properly, even as it is scaled up to the size of many quantum bits, or qubits.

For many quantum algorithms based on optimization, scientists must measure the distance between an algorithm's outputs and known training outputs, evaluated by applying a "cost function." This process is like figuring out how to go downhill on a cost "landscape." Repeatedly going downhill reveals better and better quantum algorithms that perform better and better at their tasks.

But what happens if an optimization cannot find the right direction to go downhill? If no direction gives a cost that is lower than its current cost, this is called a barren plateau — a flat landscape — and no more improvement can be made to the quantum algorithm, leaving scientists stuck.

The ASC team proved that choosing a certain approach for optimization (using a "local" cost function), guarantees that the machine-learning algorithm now avoids barren plateaus (making it impossible to make improvements) and can, therefore, be trained — such algorithms can be made to improve their functionality, guaranteed. The team's breakthrough takes an important step toward quantum advantage as it paves the way

David Chavez Selected Fellow of the American Chemical Society

David Chavez, Deputy Group Leader of the Laboratory's High Explosives Science and Technology, has been selected as a member of the 2021 class of Fellows of the American Chemical Society (ACS). ACS recognized Chavez for distinguished contributions to the field of energetic materials chemistry, particularly his development of highly energetic, fundamentally novel, and environmentally friendly materials important to national security.

A highly respected scientist, Chavez is known for his many innovations in the area of energetic materials, particularly in developing novel low-smoke, high-nitro-

gen pyrotechnics and synthesizing a potential replacement for TNT, another nitrogen-containing compound known as bis-oxadiazole. He is an often-quoted scientific expert on explosives in general.

Chavez's contributions to the ACS community also include mentoring early-career scientists from historically marginalized groups in both laboratory and classroom environments, providing access to quality chemical education, and serving and promoting the ACS program Summer Experienced for the Economically Disadvantaged (SEED). The SEED program is a paid summer internship for high school students, a program Chavez participated in at the Laboratory after his sophomore year in high school.

Decades of Research Bring Quantum Dots to Brink of Widespread Use

A new article in *Science* magazine gives an overview of almost three decades of research into colloidal quantum dots. The article also assesses the technological progress for these nanometer-sized specs of semiconductor matter and weighs the remaining challenges to pave a path toward widespread commercialization for this promising technology, which has applications in everything from TVs to highly efficient sunlight collectors.

"Thirty years ago, these structures were just a subject of scientific curiosity studied by a small group of enthusiasts," said Victor I. Klimov, coauthor of the paper and leader of the team conducting quantum dot research at the Laboratory. "Over the years, quantum dots have become industrial-grade materials exploited in a range of traditional and emerging technologies, some of which have already found their way into commercial markets."

Many advances described in the *Science* article originated at the Laboratory, including (1) the first demonstration of colloidal quantum dot lasing, (2) the discovery of carrier multiplication, (3) pioneering research into quantum dot light emitting diodes (LEDs) and luminescent solar concentrators, and (4) recent studies of single-dot quantum emitters.

Laboratory Personnel Earn Honors and Garner Recognition

From post-doc students to full-time technical staff members, Laboratory employees have earned honors

and recognition from numerous external organizations. The following are some recent examples of such honors and accolades:

- **David Chavez**, Deputy Group Leader of the Laboratory's High Explosives Science and Technology, has been selected as a member of the 2021 class of Fellows of the American Chemical Society (ACS). ACS recognized Chavez for distinguished contributions to the field of energetic materials chemistry, particularly his development of highly energetic, fundamentally novel, and environmentally friendly materials important to national security.
- The American Physical Society has selected Laboratory scientist **Travis Sjostrom** for a 2021 John Dawson Award for Excellence in Plasma Physics Research. Sjostrom is just one of seven scientists to receive the national award this year. Sjostrom's work toward broad-ranging quantum Monte Carlo calculations for the uniform electron gas earned him the John Dawson Award.
- **Wenting Li**, a post-doc in the Center for Non-linear Studies and Applied Mathematics and Plasma Physics (T-5), recently received a "[best paper](#)" award for Machine Learning Innovation at the Climate Change AI workshop held as part of the 2021 International Conference on Machine Learning. Li designs neural networks using physics that identify the location of power-grid faults that cause wildfires.

Travis Sjostrom Honored for Excellence in Plasma Physics Research

The American Physical Society has selected Laboratory scientist Travis Sjostrom for a 2021 John Dawson Award for Excellence in Plasma Physics Research. Sjostrom is just one of seven scientists to receive the national award this year.

Sjostrom has been involved in warm dense matter research for more than 10 years, with the goal of providing theoretical understanding and accurate characterization of materials in extreme conditions. Warm dense matter encompasses ionized fluids at the confluence of condensed matter physics, plasma physics, and dense liquids.

Sjostrom's work toward broad-ranging quantum Monte Carlo calculations for the uniform electron gas

earned him the John Dawson Award. These calculations provide the starting point to develop finite-temperature exchange-correlation functionals employed in density functional theory calculations.

Wenting Li Awarded “Best Paper” for Machine-Learning Innovation at ICML Workshop

Wenting Li, a post-doc in the Center for Nonlinear Studies and Applied Mathematics and Plasma Physics (T-5), recently received a “[best paper](#)” award for Machine Learning Innovation at the Climate Change AI workshop held as part of the 2021 International Conference on Machine Learning (ICML). Li designs neural networks using physics that identify the location of power-grid faults that cause wildfires. The highlight of her research is that the neural networks can work in realistic regimes where data are sparse and often unlabeled.

MISSION OPERATIONS

Acquisition Services Management Staff Members Complete More Than 450 Hours of Ariba Training

Since launching Ariba on June 1, 2021, Acquisition Services Management (ASM) staff members have participated in more than 450 hours of Ariba training. Within the first two months after launching the system, this training has already enabled ASM workers to enhance their system knowledge while continuing to support new and ongoing procurement actions. For example, workers have learned how to apply Ariba’s advanced technology to track and report all aspects of the procurement cycle and leverage new features, such as task schedules and detailed cycle-time analyses. Such continued training and exposure to every action in Ariba’s procurement-to-pay system has enabled personnel to realize ASM’s mission objectives.

ALDFO Crew Repairs Priority Waterline

A crew from the Associate Laboratory Directorate for Facilities & Operations (Maintenance and Site Services personnel from Utilities and Infrastructure) conducted emergency repairs on a potable waterline at TA-09. The crew excavated the line that feeds a water tank located

at TA-14. The job was completed as a priority 1 corrective maintenance activity, given that the waterline ensures water availability to customers and is hooked into the area’s fire-suppression system.

Personnel identified a leak that resulted from a shifted coupling. The crew cut a section of the line and then installed two Dress clamps, as well as a small section of new pipe. Upon recharging the system, the crew discovered an additional leak downstream. This leak came from a hole in the piping, possibly caused by material used for backfilling. The crew replaced a section of piping and returned the system to normal operations.

ALDFO Crews Upgrade Electrical Parts for Ion Beam Material Laboratory

Workers recently executed an electrical upgrade designed to support critical milestones for the Ion Beam Material Laboratory at the Laboratory’s Cryogenics Building B, located in Building 34 at TA-03. The work was performed by personnel in Science and Technology Operations in conjunction with personnel from Engineering Services deployed to Maintenance and Site Services’ Science and Technology Operations (MSS-STO) and Electrical Safety (MSS-ES). All organizations fall under the Laboratory’s Facilities and Operations Directorate.

The collaborators completed all work two months ahead of schedule under the guidance of the Laboratory’s Capital Projects Directorate. One minor modification consisted of installing a new 30-kilovolt-ampere transformer, a 100-ampere panel, and multiple receptors. The work was subcontracted to RG electrical because of multiple competing projects under the auspices of STO. To minimize tenant disturbance, installation was coordinated with a building outage to replace breakers.

Deputy Secretary of Energy David Turk Gives Keynote Speech at Lab-Hosted CECOP Symposium

Keynote speaker David Turk, Deputy Secretary of Energy, recognized and articulated the Laboratory’s accomplishments and contributions to the larger Nuclear Security Enterprise (NSE) in his speech during the fifth annual Cost Estimating Community of Practice (CECOP) Symposium, hosted by the Laboratory on August 3–5, 2021.

CECOP serves to enhance collaborations, encourage networking, and facilitate learning with attendees from multiple sites (including NNSA) across the entire NSE. CECOP brings subject-matter experts together so that they can share processes and applications, drive standardization and consistency, and inspire fresh, collaborative approaches to solving problems. The results improve efficiency and the bottom line for each organization. CECOP has produced notable improvements through collective efforts toward common goals, such as risk management, internal estimating capabilities, and estimating processes. Over the years, attendees have witnessed lessons learned turn into lessons applied. Because of CECOP, each site is not isolated, left to learn the hard way. Instead, sites learn from each other.

This year, the Laboratory facilitated the symposium virtually, and it was pleased to welcome Deputy Secretary Turk to deliver the keynote speech. Of the 242 attendees from national labs and other sites, about 29 percent were from NNSA, in addition to about 60 individuals representing the Laboratory.

High-Precision Camera System Deployed in July 2021 Yields Machining Efficiency

Personnel in the machine shops at the Laboratory's Prototype Fabrication (PF) Division have deployed a new two-camera system. This new system will increase the efficiency and accuracy of the division's machining process. This new Optical Tool Locator (OTL) two-camera system was funded by the Deputy Director's Office for Science, Technology and Engineering (DDSTE) FY21 capability investment and developed onsite by PF employees. Rather than use one camera like the previous system, this new system takes advantage of a second camera.

In early July 2021, personnel tested the OTL2 on multiple lathes in the PF machine shop and successfully demonstrated ease of use by producing instantaneous high-resolution images. Rather than manually measure tool nose geometry and locations, the OTL2 automatically measures and gives the resultant information onscreen. The system also modernizes older machines with new technology, thus deferring the need to replace them. Furthermore, this system is being integrated with super-precision machine tools required for acutely precise, tight-tolerance fabrications.

This is a technology not yet available on any current machining platforms; therefore, PF employees are currently leading the collaboration with machine tool manufacturers to incorporate OTL2 system and provided measurements directly into the controller. Ongoing use of the OTL2 will support the weapons engineering hydro program, subcritical experiments, stockpile modernization, plutonium sustainment, global security, and the manufacturing of non-nuclear components, all with greater efficiency and accuracy that yield significant savings in terms of costs and time.

Laboratory's Funding Determination Committee Improves Services

A Laboratory-wide funding review source instituted by the Finance and Controller divisions, the Funding Determination Committee conducts capital asset designation and related guidance to institutional project leaders who submit planned project activities. Possible capital assets include construction activities, purchased or fabricated equipment, and software.

In FY21, the committee completed various process-improvement and awareness efforts, such as hosting training events for the Lab's construction, science, engineering, and nontechnical groups. Training presentations, new forms, and a revised procedure have been updated on the Funding Determination Committee's website to ensure these resources will be readily accessible for ongoing operations.

Laboratory's Information & Technology Organization Launches New IT Ticketing System

The Laboratory's Information & Technology (IT) customers have an improved, modernized ticketing system. In July 2021, IT's former ticketing system was replaced with a new software platform known as ServiceNow. ServiceNow provides a modern platform for digital workflows, one that improves IT's help-desk functionality.

ServiceNow offers various improvements, such as the following:

- A new, modern user interface for both customers and IT support employees.

- A library of relevant, up-to-date articles to help lab employees troubleshoot issues on their own (in some cases).
- More transparent IT support data, so that customers can view open-ticket status.

A communication campaign was implemented to notify customers of the change. To assist customers, IT has implemented an internal webpage that contains general information, frequently asked questions, training, and contact information.

Laboratory Welcomes NGD Systems to the Efficient Mission Centric Computing Consortium

As the High Performance Computing (HPC) community enters an era in which computation can be offloaded to storage devices, scientists must explore the mechanisms to use and program these processing offloads. To this end, the Laboratory and [NGD Systems](#) are partnering through Los Alamos' [Efficient Mission Centric Computing Consortium \(EMC3\)](#) to explore scalable computational storage offloads for ultrascale HPC simulation environments.

"Computational storage devices become a key source of acceleration when we are able to directly interpret the data within the storage device," said Brad Settlemeyer, senior scientist in Laboratory's HPC Design Group. "With that component in place, near-storage analytics unleashes massive speedups via in-device reduction and fewer roundtrips between the device and host processors."

Computational offloads using both in-network processing and near-storage compute are becoming an important part of both scale-up and scale-out computing, with future scaling requirements virtually requiring programmable elements along the data path to achieve performance efficiency goals. The collaborative effort will explore high-capacity NVMe computational storage drive, as well as scalable computational offloads for HPC and scalable computing uses.

Laboratory Will Require All Employees and Contractors to be Fully Vaccinated Against COVID-19

Triad National Security, LLC, will soon require COVID-19 vaccinations for the Laboratory's entire workforce. Under this requirement, full vaccination will be manda-

tory for all regular employees and contractors/subcontractors. The requirement will apply to all employees — those working onsite, those teleworking, and all new-hire personnel.

Laboratory Director Thom Mason announced the requirement on August 23, 2021, in a memo to the Laboratory's workforce. The announcement coincides with the U.S. Food and Drug Administration's decision on August 23, 2021, to grant full approval to Pfizer-BioNTech's COVID-19 vaccine for people aged 16 and older. In response, NNSA Administrator Jill Hruby said she applauded the decision to take this step to protect employees and contractors from the pandemic while they continue to meet the Laboratory's critical mission requirements.

More than 85 percent of the Laboratory's employees and contractors are already fully vaccinated. An announcement will be made in the near future about when all employees must be vaccinated.

Logistics and Maintenance Site Services Work Together to Repair Cooling Coils at Otowi

Freezing temperatures this past winter damaged the chilled-water-cooling coils at the Laboratory's Otowi building. Although the coils were not repairable, it was critical that workers address the cooling issue quickly, given that the building plays an important part as a modern teleworking hub.

The Otowi building was originally cooled by using an air-wash system similar to a large evaporative cooler. Although portions of this system remain in place, personnel in two weeks refurbished the air-wash system. The refurbishment included procuring air-wash media and removing the old chilled-water coils. Workers performed some rather elaborate rigging to remove the old 4-foot by 8-foot system, as well as 700 pounds of coils, with all materials moved through 2-foot by 5-foot plenum double-doors.

The rigging crew from Logistics-Central Shops worked with craft with skills in sheet-metal, carpentry, pipefitting, painting and electrical work (all from Maintenance & Site Services-Institutional Facilities) to complete this project.

Low-Oxygen Alarm Training Pays Off

In July and August 2021, Laboratory employees responded appropriately to various low-oxygen alarms. Such effective responses demonstrate that the Laboratory is an effective learning organization. In response to each alarm, employees barricaded the area, contacted the Emergency Operations Support Center at 7-2400, and awaited the arrival of the Laboratory's Hazardous Materials Team to investigate and subsequently clear the area.

"The responses demonstrate Laboratory staff's commitment to safety and continuous improvement," said Deputy Director for Science, Technology and Engineering John Sarrao. "We must continue to be vigilant in all of our operations to ensure the safety of our co-workers. This is why one of our important safe conduct of research principles is 'cutting-edge science requires cutting-edge safety.'"

Helping improve the safety culture at the Laboratory is a concept known as SCoR, short for Safe Conduct of Research. SCoR continues to grow, with more than 700 Lab managers trained to use its eight principles as the basis for a strong safety culture. Despite its name, SCoR does not pertain only to safety or only to people conducting research. The [eight principles](#) can also help all employees perform work more effectively. Created by Battelle, SCoR has a proven track record at seven other laboratories. Like all Battelle-managed labs, Laboratory employees have embraced SCoR to learn from their challenges and reduce accidents and injuries, unnecessary risks, and distractions.

Maintenance and Equipment Updates Support Plutonium Operations

July 2021's achievements in TA-55 weapons infrastructure included waste operations, trolley updates at PF-4 (the Laboratory's Plutonium Facility), and other maintenance. On July 9, 2021, shipments of transuranic waste from the Radioassay and Nondestructive Testing (RANT) facility returned to a schedule of two shipments per week, including N3B waste. Inside PF-4, updated trolley lights were installed to support material movement; the project was planned to minimize detrimental impacts to programmatic work taking place at the plant. Personnel also implemented lighting updates, pump-seal replacement, filters, and firewater tank im-

provements to support continuing plutonium mission operations.

Newly Installed Badge Readers Enhance Office Safety and Security

The following two buildings located at the Laboratory's S-site at TA-16 recently received Apollo contactless-styled (non-damaging) badge readers: Buildings 16-900 and 16-16. Personnel installed these Apollo readers as part of the Weapons System Engineering Division Office's initiative to enhance the safety, security, and quality of life of its various facilities.

As the Associate Laboratory Directorate for Weapons (ALDW) grows, and as more staff members are vaccinated and return to work onsite, these office spaces will prove vital in supporting uncleared workers. Specifically, the new badge readers improve the safety and security of ALDW employees from the following divisions: Weapon Stockpile Modernization (Q), Engineering Technology and Design (E), Weapons Systems Engineering (W), and Weapons Facilities Operations (WFO).

Under the previous badge readers, once employees left and locked the doors, the buildings were no longer accessible to custodial staff. These buildings are located in a remote area, one that requires daily pest control and lavatory attention, so the inability of custodians to address these and other issues presented a safety and security concern, as well as a morale problem. By installing the new badge readers, which enable facilitated entry and egress of all approved employees, including custodians, ALDW has resolved these issues and contributed to the safety and security of personnel who work within the buildings.

New Storage Facility Checks All the Boxes

Workers have completed construction of a 4,000-square-foot warehouse — this new repository replaces most of the 15 or so "transportainers" the proton radiography (pRad) facility at TA-53 previously used for years to store materials and equipment.

"The new warehouse at TA-53 marks the first of many to come at the Laboratory," explained Roger Tuttle, project manager for Project Integration Office-Project Management. "Everyone is really excited about this project, because it's the first type of repeatable design that can be used again and again to meet LANL's

needs. We have all of the shop drawings and documentation ready for any future project like this.”

The completion of this warehouse is noteworthy for several reasons:

- It was constructed with pre-fabricated materials, similar to a do-it-yourself “kit” you can buy from Home Depot or Lowe’s for small, personal, DIY projects. Like those kits, the commercial-sized warehouse materials came ready to assemble, with holes pre-drilled and the steel beams and siding delivered to the site.
- The Laboratory project team had already created the design, and subcontractors poured the concrete slab that would serve as the structure’s base.
- Then, the manufacturer sent a crew to assemble the warehouse, and LANL subcontractors finished the job by adding extras, such as the fire alarm system, power and lights.

As the Proton Radiography facility prepares to support additional plutonium operations at the Laboratory, the addition of this \$2 million storage facility is both timely and functional.

New Tool Streamlines Los Alamos Awards Program Nomination Process, Tracking, and Approvals

The Laboratory’s Human Resources and Controller divisions have launched a new Los Alamos Awards Program (LAAP) tool that enables managers to recognize employees for exceptional performance and behaviors. LAAPs are different from those participating in the Leadership Incentive Program or the Strategic Contributor Incentive Plan.

The new LAAP tool replaces a longstanding, manual, and paper-driven award submission process, thus significantly improving process efficiency for Payroll, Human Resources, and managers. The tool offers a means to track submissions, in addition to a more streamlined nomination process. The nomination process includes validating nomination eligibility, simplifying approvals, and providing accurate budget reporting.

After months of dedicated work on implementing the tool, Payroll has successfully received its first automated award-submission files.

New Waterline and Fire-Suppression System Installed at Weapons Engineering Facility

Crews have installed a new fire-suppression system in and around the Laboratory’s Betatron Building, a facility located in a technical area dedicated to weapons engineering.

This project began when Laboratory engineers and fire-protection experts identified the need for fire suppression in the building. Although the facility already possessed a fire-alarm system, engineers performing a hydraulic model realized that the existing 2-in. water services that fed the building would not deliver the volume of water necessary to extinguish a fire. Implementing a design process, personnel determined that a new 12-in. waterline, routed across portions of the technical area, would adequately meet the fire-suppression needs of the building.

Because the project was part of NA-LA’s FY21 “Make it Happen List,” it was important that the new system be completed this year. Moreover, this project experienced no accidents or safety incidents throughout its execution. The project took 11 months from mobilization to completion.

NIE, HR, and Badge Office Collaborate to Streamline Onboarding Process for New Hires

The Laboratory as of July 2021 has simplified its new-hire onboarding process, thanks to teams at the Lab’s Network and Infrastructure Engineering division (NIE), Human Resources (HR), and the Badge Office, which have completed all facets of their collaborative effort. Under this new process, employees receive zTokens on the same day they undergo new-hire orientation. In addition to simplifying the new-hire experience, the new process has begun to phase out CRYPTOCards — such reduction will decrease costs, lessen sign-on complexity, support a single sign-on experience, and comply with the latest federal regulations.

Unauthorized Drone Flights are Prohibited in Laboratory-Restricted Airspace

During the week of August 23, the Laboratory reminded drone operators that it uses its Counter Unmanned

Aircraft Systems capability to intercept unauthorized flights violating established national airspace restrictions over the Lab, in addition to a Federal Aviation Administration (FAA)-designated “No Drone Zone.”

Laboratory personnel have recently detected unauthorized drone flights in restricted airspace, despite signage developed by NNSA that notifies drone operators about specific airspace boundaries where they must not fly their aircraft and that violating such airspace will have severe consequences. The Laboratory advised the public in a news release that it will seize or exercise control, confiscate, or use reasonable force to disable, damage, or destroy drones or unauthorized unmanned aircraft systems (UAS).

All airspace over the Laboratory is protected against unauthorized UAS flights. The Laboratory does not want to interfere with normal commercial or hobbyist drone flights, but it will prevent unauthorized UAS flights that may pose a threat to the safety or security of assets and personnel. In cooperation with the FAA, NNSA has defined a threat as follows: “The reasonable likelihood that an unmanned aircraft system or unmanned aircraft activity, if unabated, could inflict or otherwise cause physical harm to a person; inflict or otherwise cause damage to property or systems; interfere with the operational mission of a covered facility or asset; conduct unauthorized surveillance or reconnaissance; or result in unauthorized access to, or disclosure of, classified or otherwise lawfully protected information.”

Upgrades to West Road Create a Safer Road

Upgrades and repairs to West Road have created a safer route for commuters. The project was a collaboration between subcontractor crews and Laboratory’s Utilities and Infrastructure and Logistics divisions.

The subcontractor’s crews completed guardrail installation on West Road in mid-July, 2021. They brought the outdated and out-of-specification guardrail back into compliance with the requirements of the National Highway Traffic Safety Administration. Additionally, crews made repairs along the roadway, which had been degraded as a result of erosion.

COMMUNITY RELATIONS

Bradbury Hosts First Periodic Table Event

On August 16, 2021, the Laboratory’s Bradbury Science Museum hosted its inaugural Periodic Table event, a well-attended casual science get-together. This event’s speaker was Jennifer Harris of the Human Bioengineering Laboratory (B-10).

The Periodic Table provides an opportunity for members of the public to ask researchers a variety of questions related to a particular theme. This inaugural event was held outside at the Bathtub Row Brewing Co-Op, with Harris discussing bioengineering and personalized medicine.

The next Periodic Table, scheduled for September 20, 2021, will host R&D engineer Benigno Sandoval of Space Instrument Realization (ISR-5). Sandoval will discuss his work on creating custom instruments for use in space, with applications in national security and exploring Mars and likely other planets, too.

Community Partnerships Office Shares with Employees a Report on Childcare Availability

Staff members at the Laboratory’s Community Partnerships Office have conducted research on the current availability of childcare spaces in the region. This research was conducted after some providers closed during the COVID-19 pandemic. During the week of August 23, 2021, the findings were shared with employees to help parents looking for childcare support.

Results from nearly 50 providers in northern New Mexico, including both licensed facilities and registered in-home providers, found that more than 64 percent had availability of spaces. However, there was variability in the ages accommodated by these vacancies — it simply depended on the given provider or program. Moreover, many providers reported that they had space for greater capacity, but they were limited by current personnel shortages that they were trying to resolve.

The report contains links to extra resources, including state-administered websites such as NewMexicoKids.org and NewMexicoPreK.org. Also contained in the report is a spreadsheet of the providers who responded to the survey, providing more details on availability at the time the survey was performed.

Laboratory and Los Alamos Community Leaders Celebrate Opening of NET Facility on East Road

On July 28, 2021, the Laboratory, NNSA Field Office, congressional staff, and Los Alamos business and community members attended a ribbon-cutting ceremony to celebrate the opening of the Associate Laboratory Directorate for Weapons Production's (ADLWP) innovative New Employee Training (NET) facility.

Located on East Road in Los Alamos, the NET facility is newly leased space fully renovated — despite the COVID-19 pandemic — by teams throughout ALDWP, Training and Mission Services (ORI-1), and the Infrastructure Program Office (IFPROG). NET's innovative design elements, enhanced classrooms, and meeting rooms support mission-centric training efforts. Additionally, NET's renovation and opening underline the Laboratory's continued commitment to Los Alamos and to bolstering the county's economy.

The new facility consists of approximately 28,000 square feet of office and training space on the upper floor. Once construction is complete, NET's lower floor will provide 15,000 square feet of new office and training space, plus 6,200 square feet of storage space. The upper floor will accommodate up to 123 people at once, including the new employee cohorts, training staff, collaborators, and technical support. The lower floor will provide the facilities for experiential hands-on training, where employees will simulate work they will conduct in the future.

The building's location in Los Alamos is a key benefit to the NET Academy, as the majority of its participants await Q Clearance. Obtaining this clearance provides employees access to the Plutonium Facility. Offering offsite training enables employee onboarding to move forward without security restrictions.

Laboratory-Organized Summer Camp Helps Middle-School Students Believe in Their Math Abilities

On June 7–15, 2021, the Laboratory's Math and Science Academy (MSA) returned to in-person instruction by co-hosting its free math summer camp for Pojoaque Valley School District (PVSD) students from grades 6 through 9.

Thirty-six students took part in the two four-week-long sessions, which were designed to foster students' appreciation for mathematics, develop their problem-solving abilities, and raise their awareness so that they are better prepared to learn more-challenging mathematics. The camp also functioned as a professional learning experience for PVSD teachers, so that they could develop alternative perspectives and practices in teaching and learning mathematics.

Camp sessions were led by five PVSD teachers and two Laboratory education specialists from MSA. As the camp went on, the district teachers took more responsibility in developing and leading sessions. Support for the Mindset Math Summer Camp came from the Laboratory, Triad National Security, LLC (the Lab's operator), and the Shaggy Peak Fund of the Santa Fe Community Foundation.

Laboratory's Staff Director Gives "State of the Lab" to New Mexico's Science, Technology and Telecommunications Interim Committee

On July 22, 2021, Laboratory Staff Director Frances Chadwick addressed the New Mexico Science, Technology and Telecommunications Interim Committee (NMSTTC) on the University of New Mexico-Los Alamos campus. Chadwick's address provided a broad update on the Laboratory's operations. A bicameral legislative committee, NMSTTC consists of state senators and representatives that helps drive policymaking and regulatory actions for everything from broadband service to environmental issues.

Chadwick's presentation covered Laboratory hiring, workforce diversity, onsite work status, community initiatives, and a general overview of the Lab's key capability pillars, including notable examples of recent world-leading science and research. She also discussed the Laboratory's investments in local and state economic development, such as the following examples:

- creating multiple workforce pipelines through state colleges and universities,
- \$486 million in procurements from state businesses in FY20,
- the Laboratory-Embedded Entrepreneur Program (LEEP),

- \$2.8 million donated by employees (with \$2.5 from Triad National Security, LLC) in the Lab's 2020 giving campaign, and
- the recent development of the Technology Readiness Gross Receipts Initiative (TRGR), a program that provides state businesses opportunities to work with Los Alamos or Sandia national laboratories to advance products past the invention stage to market-ready technology.

New Laboratory Partnership Enables Northern New Mexico Math Teachers to Earn New Specialty Degree

On August 4, 2021, the Laboratory hosted a graduation ceremony at the Laboratory's Dorothy McKibbin Conference Center in Santa Fe. Six teachers from northern New Mexico graduated as the first-ever cohort to earn from New Mexico Highlands University a Master's Degree in Educational Leadership with an Emphasis in K-8 Mathematics Teacher Leadership.

This new degree program was developed by a collaboration between teachers, the university, and the LANL Math & Science Academy, a professional development program that supports the teaching of math and science in the region. Graduates Richard Armentrout, Travis Gibson, April Grant-Torrez, Brett Hawkins, Daniela Romero, and Beth Ziomek will return to their classrooms and raise the bar in teaching K-8 mathematics at public schools in Abiquiu, Cuba, Los Alamos, and Pojoaque.

New Program Offers High-School Students a Path to Trade Apprenticeships

A new partnership between the Laboratory, high schools in the region, and the New Mexico Building and Construction Trades Council (NMBCTC) is helping to create a pipeline in northern New Mexico to fill in-demand positions like this at the Laboratory and in the wider community. The program prepares high school students for craft trades using a nationally recognized Multi Core Craft Curriculum (MC3) developed by North America's Building Trades Unions (NABTU).

The pilot has seen the program offered at Taos and Questa school districts. Two more schools plan to enlist soon, with Pecos Independent School joining in fall of

2021 and ECO High School in Santa Fe coming onboard in the spring of 2022. After completing the curriculum and successfully graduating high school, students can directly enter into an apprenticeship within a participating union (for example, UA Local Union No. 412 Plumbers and Pipefitters, which has been working with the Laboratory on the program).

The Laboratory facilitates connections between the schools and the NMBCTC. Laboratory operator Triad National Security, LLC, provided support via some initial investments and supplements to teacher pay. Health is a collaborative, multidisciplinary approach — one working at the local, regional, national, and global levels. The goal is to achieve optimal health outcomes by recognizing the interconnection between people, animals, plants, and their shared environment.

Nonprofit Leaders Learn About New Laboratory Partnership Opportunities at Online Event

On July 13, 2021, the Laboratory's Community Partnerships Office hosted a well-attended online Community Conversation that introduced nonprofit leaders on new ways to collaborate with the Laboratory. More than 90 participants represented organizations with a range of missions, from education and the arts to economic development and behavioral health. Elected officials and tribal leaders also took part.

Laboratory Director Thom Mason gave an update on recent community-related activities from the Laboratory. Mason also outlined two new opportunities for collaboration between regional organizations and LANL. Under the Laboratory's Time & Talent program, employees who track their volunteer time with northern New Mexico nonprofits make the nonprofits they support eligible to enter a drawing for a \$500 grant from Triad National Security, LLC, the Laboratory's operator. In addition, a new Community Technical Assistance program makes nonprofits, tribal governments, and non-federal government entities in northern New Mexico eligible to receive Laboratory assistance, leveraging Laboratory expertise and technology to implement short-term projects.

The final part of the online event saw Rebecca Gomez, senior program coordinator at the New Mexico Association of Grantmakers, outline how nonprofits can best recruit and retain volunteers, as well as what makes a successful volunteer program.

SELECTED MEDIA COVERAGE

[LANL Debuts New Hazmat Robot](#)

KRQE News (7/28)

Los Alamos National Lab has a unique new robot to handle dangerous situations. “There’s no other robot on the market that can do what this robot can do, which is why we were so excited to get our hands on it,” said LANL hazmat specialist Charles Gibson.

[Novel Method of Imaging Silicon Anode Degradation May Lead to Better Batteries](#)

Phys.org (7/29)

A novel method of characterizing the structural and chemical evolution of silicon and a thin layer that governs battery stability may help resolve issues that prevent using silicon for high-capacity batteries, according to a group of researchers.

[Neutrons Cluster in Nuclear Reactors](#)

Physics World—Isabella Dumé (7/31)

Researchers at Los Alamos National Laboratory developed a neutron detector capable of making such observations. This detector, known as Nomad, has an excellent time resolution and can therefore measure how neutrons are spatially distributed within a small reactor at a given time.

[What Does the Edge of the Solar System Look Like?](#)

Live Science—Randyn Bartholomew (8/02)

The outer heliosphere marks the region of space where the solar wind, or the stream of charged particles emitted from the sun, is “deflected and draped back” by interstellar radiation, said Dan Reisenfeld, a space science researcher at Los Alamos National Laboratory.

[Quantum Metasurfaces Manipulate Free Photons](#)

Photonics.com (8/03)

A team at Los Alamos National Laboratory proposes that modulated [quantum](#) metasurfaces can control all properties of [photonic](#) qubits. According to the team, such a breakthrough would affect the fields of quantum information, communications, sensing, imaging, and energy and momentum harvesting.

[David Chavez Selected Fellow of the American Chemical Society](#)

Los Alamos Reporter (8/05)

David Chavez, deputy group leader of the High Explosives Science and Technology group at Los Alamos National Laboratory, has been selected as a member of the 2021 class of Fellows of the American Chemical Society (ACS).

[CSU Gets \\$3.2 Million to Develop Algae for Use as Biofuel, Food](#)

9News (8/05)

CSU will partner with Los Alamos National Laboratory and Arizona State University for strain engineering, Qualitas Health for outdoor cultivations and Quantitative BioSciences Inc. and CSU startup OptiEnz Sensors LLC for sensor development.

[Translation Software Enables Efficient Storage of Massive Amounts of Data in DNA Molecules](#)

SciTech Daily (8/07)

In support of a major collaborative project to store massive amounts of data in DNA molecules, a Los Alamos National Laboratory-led team has developed a key enabling technology that translates digital binary files into the four-letter genetic alphabet needed for molecular storage.

[Coating Could Be the Answer for Silicon Anodes](#)

Materials Today (8/08)

“With this new understanding, we propose to improve silicon nanowire lithium-ion battery performance by developing a coating approach that isolates the silicon from the electrolyte,” said Jinkyong Yoo, a Los Alamos National Laboratory staff scientist and a corresponding author of the paper.

[Scientists Pave the Way for Nanotube Innovation](#)

AZO Nano (8/09)

Scientists have learned how to place crystalline defects in new materials with atomic-scale precision. This enables materials that can control excitons--energy carriers that are similar to subatomic particles. This work was conducted in part at the Center for Integrated Nanotechnologies, a DOE Office of Science user facility, and the Los Alamos National Laboratory (LANL) Center for Nonlinear Studies.

[Smoky Skies Raise Health Concerns](#)

Albuquerque Journal (8/09)

Los Alamos National Laboratory atmospheric scientist Manvendra Dubey scans his computer screen, eyeing a map of wildfire smoke plumes swirling across the U.S.

[Los Alamos National Lab Introduces New Robotic Team Member](#)

KOB TV—Brett Luna (8/10)

Los Alamos National Lab is welcoming a new robotic member to its emergency hazmat team. With mechanical arms that can reach out and grab hazardous materials ranging from chemical, energetic, radiological, toxic or biological – it can do it all.

Vax 2 the Max' \$5M Grand Prize Winner Announced

KOAT-TV (8/10)

Romero told KOAT he has worked as a design engineer with Los Alamos National Labs for 19 years. He said he initially was not planning to get the COVID-19 vaccine but then a good friend died from the virus. "It hit me hard, I didn't want to risk my life and the life of my family. I didn't want to be stubborn, so I got vaccinated," Romero said.

An Overview of Three Decades of Research into Colloidal Quantum Dots

AZO Quantum (8/11)

A new article in Science magazine gives an overview of almost three decades of research into colloidal quantum dots, assesses the technological progress for these nanometer-sized specs of semiconductor matter, and weighs the remaining challenges on the path to widespread commercialization for this promising technology with applications in everything from TVs to highly efficient sunlight collectors.

Harnessing the Power of Uranium To Treat Diseases Like Cancer

SciTech Daily (8/11)

Scientists have developed a new system for producing radioactive isotopes, or "radioisotopes" for cancer therapy. The system uses a simple radionuclide generator to repeatedly separate thorium-226 from its longer-lived parent isotope, uranium-230.

LANL Employees' Generosity Provides More Than 700 Backpacks for Students Returning to School

Los Alamos Reporter (8/11)

As the new school year begins, Los Alamos National Laboratory employees have been making sure children in Northern New Mexico can return to their classrooms with everything they need to succeed by providing more than 700 backpacks with school supplies to schools and regional partners.

New Name Change Service Makes It Easier for Researchers to Claim Their Earlier Work

Los Alamos Daily Post (8/12)

A new partnership provides an effortless way for researchers to change their names and claim published papers from all stages of their careers. Announced July 28, the partnership includes Los Alamos National Laboratory (LANL), 16 other national laboratories, and 13 scientific publishers and journals. It enables the researchers' institutions to initiate name change requests on their behalf, offering an official validation mechanism.

Northern New Mexico Math Teachers Earn New Specialty Degree

Los Alamos Reporter (8/12)

Six Northern New Mexico teachers comprise the first-ever cohort to graduate with the new Master's Degree in Educational Leadership with an Emphasis in K-8 Mathematics Teacher Leadership from New Mexico Highlands University. The degree is a collaboration between the teachers, the University, and the Math & Science Academy at Los Alamos National Laboratory, a professional-development program supporting the teaching of math and science in the region.

Collaboration Highlights the Benefit of High-Temperature PEM Fuel Cells

Yahoo! Finance (8/16)

As fuel cells extend their territory to include heavy-duty vehicles, new demands for proton conductors, a critical component of fuel cells, have emerged. Co-authors of an article in "Joule" include Yu Seung Kim, Research Scientist at Los Alamos National Laboratory.

Variational Quantum Algorithms can Extract the Most Performance from Noisy, Error-Prone Hardware

AZO Quantum—Laura Thomson (8/16)

As reported in a new article in Nature Reviews Physics, instead of waiting for fully mature quantum computers to emerge, Los Alamos National Laboratory and other leading institutions have developed hybrid classical/quantum algorithms to extract the most performance—and potentially quantum advantage—from today's noisy, error-prone hardware.

W88 Nuclear Warhead Modernized with "Brain" Transplant

New Atlas—David Szondy (8/16)

A key component of the US nuclear deterrent has reached a major milestone as production of the first upgraded W88 Alt 370 nuclear warhead is completed. Developed by Sandia National Laboratories, the Kansas City National Security Campus, the Y-12 National Security Complex, Los Alamos National Laboratory, and Pantex, the upgraded warhead gets an improved arming mechanism, or "brain", as part of the program to extend its service life.

For a Healthier World, Start with Biodiversity

Discover Magazine—Andrew Bartlow (8/17)

Biodiversity—the measure of variability of life in a habitat or ecosystem—impacts livelihoods, food security and productivity in a variety of economic sectors, including tourism and agriculture. Biodiversity also impacts the spread of Infectious diseases, which can

severely impact individuals, communities, and society as a whole. Preserving biodiversity is one important step to creating a healthier world.

Effect of ‘Eddy Killing’ in Oceans is No Longer a Matter of Guesswork

PhysOrg—Bob Marcotte (8/19)

In a paper in *Science Advances*, researchers from the University of Rochester and Los Alamos National Laboratory document for the first time how the wind, which propels larger currents, has the opposite effect on eddies less than 260 kilometers in size—resulting in a phenomenon called “eddy killing.”

New SARS-CoV-2 Variants Have Changed the Pandemic. What Will the Virus do Next?

Science—Kai Kupferschmidt (8/19)

Bette Korber at Los Alamos National Laboratory and her colleagues first suggested that D614G, the early mutation, was taking over because it made the virus better at spreading. She says skepticism about the virus’ ability to evolve was common in the early days of the pandemic.

How COVID-19 Helped Us Understand the Human, Health, and Earth Connection

Santa Fe Reporter—Morgan Gorris (8/20)

The COVID-19 pandemic has changed our lives in ways big and small—from mask wearing and social distancing to childcare and videoconferencing—imposing fundamental shifts in how we lived, worked, attended school, and interacted with our loved ones.

Authorities Warn Against Flying Drones Over LANL

Associated Press (8/23)

Authorities at one of the nation’s top nuclear weapons laboratories issued a warning Monday that airspace over Los Alamos National Laboratory is off-limits.

Los Alamos National Laboratory Requires All Employees to Get Vaccinated

Santa Fe New Mexican—Scott Wyland (8/24)

Los Alamos National Laboratory soon will require its entire workforce to be vaccinated against COVID-19 under a new policy announced Monday. All regular employees, new hires and on-site contractors and subcontractors will be required to get the full series of shots — and those who fail to do so by the deadline could be fired.

Mountains of Data: An Unprecedented Climate Observatory Could Predict the Future of Water

SciTech Daily (8/24)

SAIL is truly a broad, collaborative effort. ARM is co-managed by nine DOE national labs; Los Alamos

National Lab leads the overall management and operations of the ARM mobile observatory while scientists from several other DOE labs, including Argonne, Brookhaven, Pacific Northwest, and Oak Ridge National Labs, work closely with Los Alamos and Berkeley Lab to support SAIL science and operations.